

over Kuntz in view of U.S. Patent No. 4,878,915 issued to Brantigan on November 7, 1989. Claims 21, 47, 71, 93 and 119 were rejected under 35 U.S.C. § 103 over Kuntz in view of U.S. Patent No. 4,961,740 issued to Ray on October 9, 1990.

Please amend the Application as follows:

IN THE CLAIMS:

Cancel claims 27, 52, 76, 83, 85, 97, 99, 100, 133, and 134.

A1 1. (amended) [A frusto-conical] An interbody spinal fusion implant for insertion across a disc space between adjacent vertebrae of a human spine, the implant comprising[:] a body having an insertion end, a trailing end, and an outer surface[; and] including bone engaging means for engaging said implant to adjacent vertebrae of the spine, the outer locus of said bone engaging means forming a substantially frusto-conical configuration, said implant being made of a material appropriate for human implantation.

9. (amended) The spinal fusion implant of claim 1 [having] in which said body has a plurality of openings [capable] for retaining fusion promoting material.

A2 10. (amended) The spinal fusion implant of claim 1 in which said bone engaging means [comprises] includes said outer surface being porous at least in part.

17. (amended) The spinal fusion implant of claim 1 in which said

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[implant] body has an internal chamber and [an access opening] means for accessing said internal chamber.

19. (amended) The spinal fusion implant of claim 17 in which said [implant comprises] body includes a wall surrounding said internal chamber.

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20. (amended) The spinal fusion implant of claim [17] 19 in which said wall has a plurality of openings passing therethrough in communication with said internal chamber.

21. (amended) The spinal fusion implant of claim 17 in which said [implant] body has means for closing said accessing means [access opening].

25. (amended) The spinal fusion implant of claim 1 [having] in which said body has a longitudinal central axis and at least one truncated side forming a planar surface parallel to said central axis.

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26. (amended) [A frusto-conical] An interbody spinal fusion implant for insertion across a disc space between two adjacent vertebrae of a human spine, the implant comprising[:] a body having a substantially frusto-conical configuration along at least a portion of said body oriented toward the adjacent vertebrae, said body having an insertion end, a trailing end, and an outer surface[;

Q5 and] including

bone engaging means for engaging said implant to the adjacent vertebrae [of the spine], the locus of said bone engaging means forming a substantially cylindrical configuration, said implant being made of a material appropriate for human implantation.

Q6 34.(amended) The spinal fusion implant of claim 26 [having] in which said body has a plurality of openings [capable] for retaining fusion promoting material.

Q7 35.(amended) The spinal fusion implant of claim 26 in which said bone engaging means [comprises] includes said outer surface being porous at least in part.

Q8 42.(amended) The spinal fusion implant of claim 26 in which said [implant] body has an internal chamber and [an access opening] means for accessing said internal chamber.

Q9 44.(amended) The spinal fusion implant of claim 42 in which said [implant comprises] body includes a wall surrounding said internal chamber.

Q10 47.(amended) The spinal fusion implant of claim 42 in which said [implant] body has means for closing said accessing means [access opening].

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48.(amended) The spinal fusion implant of claim 26 in which one of said ends [of said implant] includes an engagement means for engaging instrumentation for the insertion of said implant.

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51.(amended) The spinal fusion implant of claim 26 [having] in which said body has a longitudinal central axis and at least one truncated side forming a planar surface parallel to said central axis.

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53.(amended) [A frusto-conical] An interbody spinal fusion implant for insertion across a disc space between the adjacent vertebrae, the implant comprising[:] a body having a substantially frusto-conical configuration along at least a portion of said body oriented toward the adjacent vertebrae, said body having, an insertion end, a trailing end, and an outer surface[; and] including bone engaging means for engaging said implant to the adjacent vertebrae [of the spine], the outer locus of said bone engaging means forming a substantially frusto-conical configuration, said implant being made of a material appropriate for human implantation.

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59.(amended) The spinal fusion implant of claim 53 [having] in which said body includes a plurality of openings [capable] for retaining fusion promoting material.

60.(amended) The spinal fusion implant of claim 53 in which said

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bone engaging means [comprises] includes said outer surface being porous at least in part.

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67.(amended) The spinal fusion implant of claim 53 in which said implant has an internal chamber and [an access opening] means for accessing said internal chamber.

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69.(amended) The spinal fusion implant of claim 67 in which said [implant comprises] body includes a wall surrounding said internal chamber.

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70.(amended) The spinal fusion implant of claim [67] 69 in which said wall has a plurality of openings passing therethrough in communication with said internal chamber.

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71.(amended) The spinal fusion implant of claim 67 in which said [implant] body has means for closing said accessing means [access opening].

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72.(amended) The spinal fusion implant of claim 53 in which one of said ends [of said implant] includes an engagement means for engaging instrumentation for the insertion of said implant.

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75.(amended) The spinal fusion implant of claim 53 [having] in which said body has a longitudinal central axis and at least one truncated side forming a planar surface parallel to said central

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axis.

Q16 77.(amended) An interbody spinal fusion implant for insertion across a disc space between adjacent vertebrae of a human spine, the implant comprising[:] a body having a substantially cylindrical configuration, an insertion end, a trailing end, and an outer surface[; and bone engaging means] including a plurality of posts spaced apart along at least a portion of said outer surface of said body for engaging said implant to adjacent vertebrae of the spine, the locus of said [bone engaging means] plurality of posts forming a substantially cylindrical configuration, said implant being made of a material appropriate for human implantation.

Q17 81.(amended) The spinal fusion implant of claim 77 [having] in which said body includes a plurality of openings [capable] for retaining fusion promoting material.

Q17 82.(amended) The spinal fusion implant of claim [78] 77 in which [said bone engaging means comprises] said outer surface [being] is porous at least in part.

Q18 84.(amended) The spinal fusion implant of claim [83] 77 in which said plurality of posts have a head portion and a stem portion, said head portion having a wider diameter than said stem portion.

Sub C97 Q19 86.(amended) The spinal fusion implant of claim 77 [78 in which said bone engaging means includes] further comprising a plurality

Q19 of surface roughenings for engaging said adjacent vertebrae and for maintaining said implant in place, said surface roughenings being present on at least a portion of said outer surface of said [implant] body.

Q20 89.(amended) The spinal fusion implant of claim [78] 77 in which said implant has an internal chamber and [an access opening] means for accessing said internal chamber.

91.(amended) The spinal fusion implant of claim 89 in which said [implant comprises] body includes a wall surrounding said internal chamber.

92.(amended) The spinal fusion implant of claim [89] 91 in which said wall has a plurality of openings passing therethrough in communication with said internal chamber.

Q21 93.(amended) The spinal fusion implant of claim 89 in which said [implant] body has means for closing said accessing means [access opening].

94.(amended) The spinal fusion implant of claim [78] 77 in which one of said ends [of said implant] includes an engagement means for engaging instrumentation for the insertion of said implant.

95. (amended) The spinal fusion implant of claim [78] 77 in which at least a portion of said outer surface comprises wells having at least partial walls.

96. (amended) The spinal fusion implant of claim [78] 77 in which said implant is configured to be placed in close proximity in a side by side alignment to a second spinal fusion implant, said first and second implants when placed together having a combined overall width that is less than the sum of the individual maximum diameters of each of said first and second implants.

98. (amended) [A frusto-conical] An interbody spinal fusion implant for insertion across a disc space between two adjacent vertebrae of a human spine, the implant comprising[:] a body having a substantially frusto-conical configuration along at least a portion of said body oriented toward the adjacent vertebrae, said body having, an insertion end, a trailing end, and an outer surface[; and] including bone engaging means for engaging said implant to the adjacent vertebrae [of the spine], said implant being made of a material appropriate for human implantation.

102. (amended) The spinal fusion implant of claim 101 in which said insertion end [comprises a] is tapered [leading portion].

107. (amended) The spinal fusion implant of claim 98 [having] in which said body includes a plurality of openings [capable] for



retaining fusion promoting material.

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108. (amended) The spinal fusion implant of claim 98 in which said bone engaging means [comprises] includes said outer surface being porous at least in part.

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115. (amended) The spinal fusion implant of claim 98 in which said implant has an internal chamber and [an access opening] means for accessing said internal chamber.

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117. (amended) The spinal fusion implant of claim 115 in which said [implant comprises] body includes a wall surrounding said internal chamber.

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118. (amended) The spinal fusion implant of claim [115] 117 in which said wall has a plurality of openings passing therethrough in communication with said internal chamber.

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119. (amended) The spinal fusion implant of claim 115 in which said [implant] body has means for closing said accessing means [access opening].

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120. (amended) The spinal fusion implant of claim 98 in which one of said ends [of said implant] includes an engagement means for engaging instrumentation for the insertion of said implant.

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123.(amended) The spinal fusion implant of claim 98 [having] in which said body has a longitudinal central axis and at least one truncated side forming a planar surface parallel to said central axis.

Sub C12  
124.(amended) [A frusto-conical] An interbody spinal fusion implant for insertion across the disc space between adjacent vertebrae of a human spine, the implant comprising[:] a body having an insertion end, a trailing end, and an outer surface[; and] bone engaging means for engaging said implant to adjacent vertebrae of the spine, the outer locus of said bone engaging means forming a substantially frusto-conical configuration [substantially] along a portion of said bone engaging means in contact with said adjacent vertebrae, said implant being made of a material appropriate for human implantation.

125.(amended) The implant of claim 124 in which said body has a substantially frusto-conical configuration [substantially] along a portion of said outer surface [in contact with] oriented toward said adjacent vertebrae.

126.(amended) The implant of claim 124 in which said body has a substantially cylindrical configuration [substantially] along a portion of said outer surface [in contact with] oriented toward said adjacent vertebrae.

130.(amended) The spinal fusion implant of claim 124 [having] in which said body includes a longitudinal central axis and at least one truncated side forming a planar surface parallel to said central axis.

Sub 329  
131.(amended) A spinal fusion implant for insertion across the disc space between adjacent vertebrae of human spine, the implant comprising[:] a body having an outer locus larger than the space between two adjacent vertebrae to be fused[, said outer locus being substantially cylindrical along a portion of said implant in contact with said adjacent vertebrae; and

bone engaging means] said having a mesh-like material on the exterior of said body, said mesh-like material having a plurality of interstices for receiving fusion promoting material and for engaging said implant to said adjacent vertebrae of the spine [on the exterior of said body], said implant being made of a material appropriate for human implantation.

Sub 05  
135.(amended) The spinal fusion implant of claim 131 [in which said bone engaging means includes] further comprising a plurality of surface roughenings for engaging said adjacent vertebrae and for maintaining said implant in place, said surface roughenings being present on at least a portion of said outer surface of said implant.

136.(amended) The spinal fusion implant of claim 131 [having] in

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which said body includes a longitudinal central axis and at least one truncated side forming a planar surface parallel to said central axis.

Please add the following new claims:

Sub C167  
137.(new) An interbody spinal fusion implant for insertion across a disc space between two adjacent vertebrae of a human spine, the implant comprising a body having a first end, a second end, arcuate portions oriented toward the adjacent vertebrae, and a distance between said arcuate portions increasing from said first end to said second end; and

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bone engaging means for engaging said implant to the adjacent vertebrae.

✓ 138.(new) The spinal fusion implant of claim 137 in which said bone engaging means includes second arcuate portions oriented toward the adjacent vertebrae.

✓ 139.(new) The spinal fusion implant of claim 137 in which said bone engaging means comprises a plurality of posts spaced apart along at least a portion of the outer surface of said body.

✓ 140.(new) The spinal fusion implant of claim 139 in which said plurality of posts have a head portion and a stem portion, said head portion having a wider diameter than said stem portion.

✓ 141.(new) The spinal fusion implant of claim 139 in which said bone engaging means comprises a mesh-like material having a plurality of interstices for receiving fusion promoting material.

Sub C17 142.(new) The spinal fusion implant of claim 139 in which said bone engaging means includes a plurality of surface roughenings for engaging said adjacent vertebrae and for maintaining said implant in place, said surface roughenings being present on at least a portion of said outer surface of said implant.

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Cont 143.(new) The spinal fusion implant of claim 142 in which said surface roughenings include a plurality of ratchetings.

144.(new) The spinal fusion implant of claim 142 in which said surface roughenings include knurling.

Sub C18 145.(new) An interbody spinal fusion implant for insertion across a disc space between two adjacent vertebrae of a human spine, the implant comprising:

a body having a first end, a second end, and an outer surface including bone engaging means for engaging said implant to the adjacent vertebrae, said bone engaging means having arcuate portions oriented toward the adjacent vertebrae, and a distance between said arcuate portions increasing from said first end to said second end.

✓ 146.(new) The spinal fusion implant of claim 145 in which said bone engaging means comprises a plurality of posts spaced apart along at least a portion of the outer surface of said body.

✓ 147.(new) The spinal fusion implant of claim 146 in which said plurality of posts have a head portion and a stem portion, said head portion having a wider diameter than said stem portion.

✓ 148.(new) The spinal fusion implant of claim 145 in which said bone engaging means comprises a mesh-like material having a plurality of interstices for receiving fusion promoting material.

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Sub C197*  
149.(new) The spinal fusion implant of claim 145 in which said bone engaging means includes a plurality of surface roughenings for engaging said adjacent vertebrae and for maintaining said implant in place, said surface roughenings being present on at least a portion of said outer surface of said implant.

✓ 150.(new) The spinal fusion implant of claim 149 in which said surface roughenings include a plurality of ratchetings.

✓ 151.(new) The spinal fusion implant of claim 149 in which said surface roughenings include knurling.

*Sub C197*  
153.(new) The spinal fusion implant of claim 77 in which said body has a plurality of openings passing therethrough so as to allow

bone to grow through said implant from one of the adjacent vertebrae to another of the adjacent vertebrae.

✓ 154.(new) The spinal fusion implant of claim 98 in which said body has a plurality of openings passing therethrough so as to allow bone to grow through said implant from one of the adjacent vertebrae to another of the adjacent vertebrae.

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Cont.  
✓ 155.(new) The spinal fusion implant of claim 124 in which said body has a plurality of openings passing therethrough so as to allow bone to grow through said implant from one of the adjacent vertebrae to another of the adjacent vertebrae.

✓ 156.(new) The spinal fusion implant of claim 137 in which said body has a plurality of openings passing therethrough so as to allow bone to grow through said implant from one of the adjacent vertebrae to another of the adjacent vertebrae.

✓ 157.(new) The spinal fusion implant of claim 145 in which said body has a plurality of openings passing therethrough so as to allow bone to grow through said implant from one of the adjacent vertebrae to another of the adjacent vertebrae.

✓ 158.(new) The spinal fusion implant of claim 77 is which said implant is made of a material that is stronger than bone.

✓ 159. (new) The spinal fusion implant of claim 98 is which said implant is made of a material that is stronger than bone.

✓ 160. (new) The spinal fusion implant of claim 124 is which said implant is made of a material that is stronger than bone.

✓ 161. (new) The spinal fusion implant of claim 137 is which said implant is made of a material that is stronger than bone.

✓ 162. (new) The spinal fusion implant of claim 145 is which said implant is made of a material that is stronger than bone.

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Cont  
163. (new) The spinal fusion implant of claim 77 in which said body has a length in the range of 10-32mm and a diameter in the range of 10-24mm.

164. (new) The spinal fusion implant of claim 98 in which said body has a length in the range of 10-32mm and a diameter in the range of 10-24mm.

165. (new) The spinal fusion implant of claim 124 in which said body has a length in the range of 10-32mm and a diameter in the range of 10-24mm.

166. (new) The spinal fusion implant of claim 137 in which said body has a length in the range of 10-32mm and a diameter in the range of